PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 :
G06K 7/00, 19/00, G11B 13/00

A1

(11) International Publication Number: WO 00/68868

(43) International Publication Date: 16 November 2000 (16.11.00)

(21) International Application Number: PCT/US00/12868

(22) International Filing Date: 11 May 2000 (11.05.00)

(30) Priority Data:

09/309,743	11 May 1999 (11.05.99)	US
09/447,157	23 November 1999 (23.11.99)	US

(71) Applicant: DIGITAL CASTLES [US/US]; Suite 160, 17821 E. 17th Street, Tustin, CA 92780 (US).

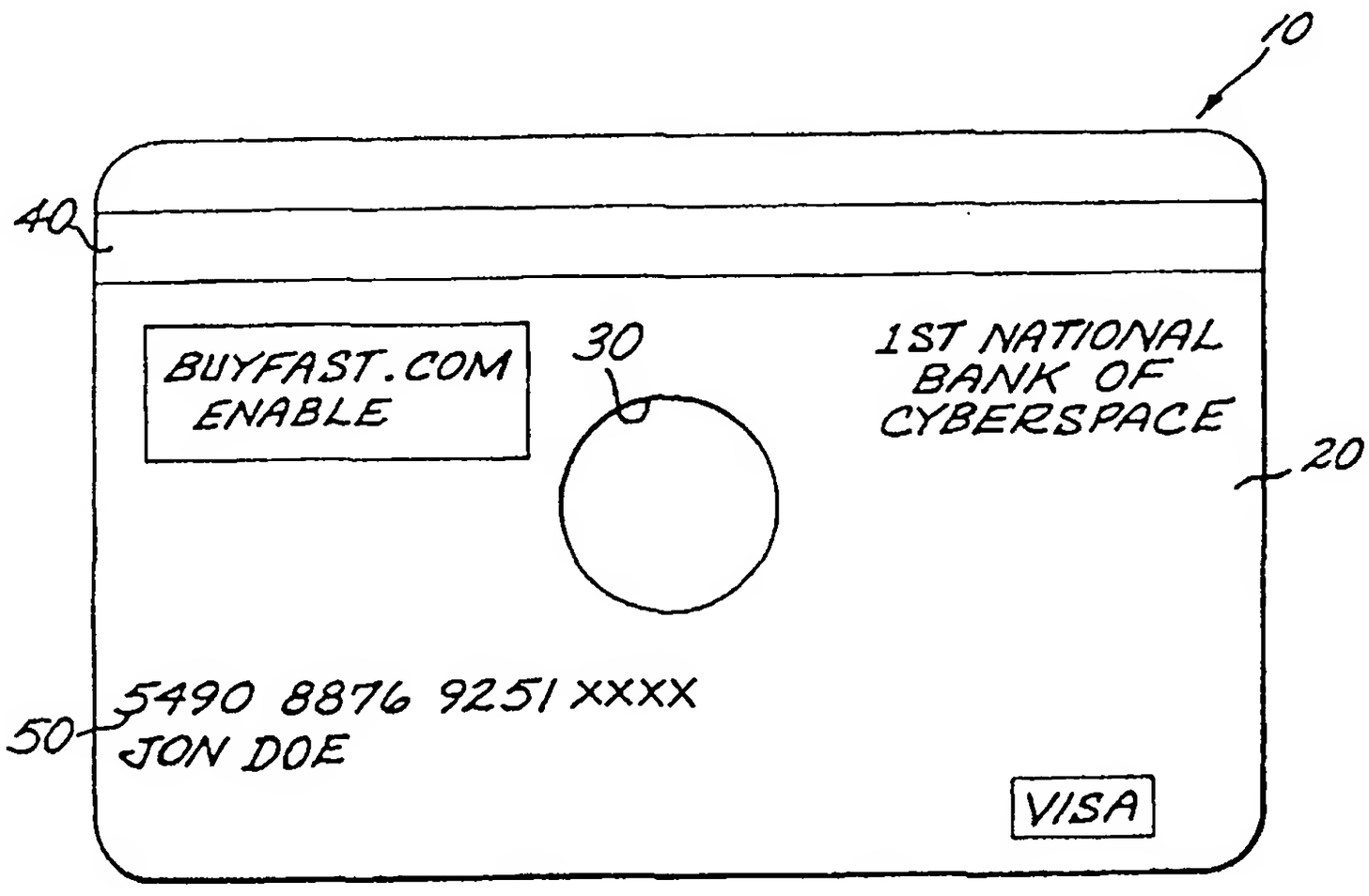
(72) Inventors: DILDAY, Robert, Burr; 31352 Via Santa Maria, San Juan Capistrano, CA 92675 (US). SCARAFIOTTI, Timothy, E.; 31342 Paseo Cadiz, San Juan Capistrano, CA 92675 (US).

(74) Agent: SCHOOLEY, Vern; Fulwider Patton Lee & Utecht, LLP, Suite 1550, 200 Oceangate, Long Beach, CA 90802 (US).

(81) Designated States: AE, AG, AL, AM, AU, AZ, BA, BB, BG, BR, BY, CA, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, RO, RU, SD, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published
With international search report.

(54) Title: DATA STORAGE CARD HAVING BOTH LINEAR AND ANNULAR DATA REGIONS



(57) Abstract

A hybrid dual–media data storage card (10) conforming in size and dimensions generally equivalent to a common credit card. One side of the card (10) includes a magnetic strip (40), enabling the card to be used in standard magnetic card readers such as those found in automated teller machines ("ATMs"), credit card readers, security entry control devices, and the like. The opposite side of the card (10) is configured with annular optical data tracks (22) designed to be read by a CD or DVD drive. A central hole (30) allows the card to be inserted onto the rotatable spindle of a standard tray–loading CD or DVD drive.

DATA STORAGE CARD HAVING BOTH LINEAR AND ANNULAR DATA REGIONS

BACKGROUND OF THE INVENTION

Field of the Invention:

This invention relates generally to the field of storage devices for electronic data, and more specifically to card-type devices having both linear magnetic and annular optical data storage regions.

Description of the Prior Art:

A need exists in the marketplace for data storage devices that have sufficient capacity to store relatively large amounts of data, do not require new or custom designed read/write drive devices, and are configured in a physical format that is both already familiar and comfortable to large segments of the market and easy to carry and transport. Such a data storage device can also be made more secure by utilizing multiple data storage media on or in the device.

The common consumer credit card has come to set the standard for a physical configuration that is easy to handle and easy to store, and has gained wide acceptance in the marketplace. A wide variety of other cards are based on the credit card form, from video store membership cards to state driver licenses. Further, the market for items that hold, store, organize, and display credit cards and similarly sized other cards is very strong. Finally, even widely disparate products such as multipurpose tools (in which various tools such as knives and screwdrivers fold out for use) and electronic calculators can be found in forms that mimic at least the two larger dimensions of common credit cards. Clearly, the market place finds value in devices with credit-card-like dimensions.

The dawning of the Information Age has seen the marketplace also learn to need large-capacity, highly mobile storage devices capable of carrying not only "flat" (i.e., ASCII text only) data files, but binary application files and sound and video files. Two forms of data storage have emerged as standards: magnetic and optical. Magnetic storage involves the electrical encoding of analog or digital information on a magnetic surface. Optical storage commonly involves encoding digital information as marks or pits on a surface that is read by reflected light, often by the directed and focused light of a laser beam.

In order to write to or read from either optical or magnetic storage material, the storage material must be mounted on a supporting structure, often a plastic or resin substrate, and engaged in motion relative to a read/write drive device so that the encoded information may be stored or detected, depending on whether a write or read operation is desired, in a serial fashion. An elongated strip of storage material requires that the storage materials be "swiped" linearly past the detector/encoder element of the read/write drive device. Higher capacity storage is achieved by spinning the storage material around an axis perpendicular to the plane of the surface of the storage material and aligning annular data "tracks" in either concentric parallel nested circular tracks or in a single concentric spiral track.

Elongated magnetic strips have become common on today's credit cards (and cards for countless other purposes) and are usually encoded with information identifying or associated with the proper bearer of the card, as well as being encoded with other information pertinent to the particular use or setting. For instance, a card's magnetic stripe may also be encoded with, besides a customer's account number and identity, the current account balance left in an account for the purchase of remotely accessed long distance telephone services. Annular disks of magnetic material form the basis of today's floppy, hard or fixed, and removable disks used in computers throughout the world. Magnetic storage has the advantages of being fast and inexpensive, but can be relatively fragile and sensitive to environmental conditions that can cause errors and failures.

Optical storage, which can be laid out in strips similar to magnetic strips, has found more success in annular form in compact disc ("CD") form, and its next-generation successor, digital versatile disc (sometimes also referred to as digital video disc; "DVD"). Both exist in multiple formats, including, but not limited to: Read-Only Memory (i.e., CD-ROM, DVD-ROM), Random Access Memory (i.e., DVD-RAM), Recordable (i.e., CD-R, DVD-R), Rewriteable (i.e., CD-RW, DVD-RW), Audio (i.e., CD, DVD-Audio), and Video (i.e., CDV, DVD-Video). The recordable formats are also sometimes classified as Write-Once-Read-Many ("WORM", i.e., CD-WORM, DVD-WORM) and Write-Many-Read-Many ("WMRM", i.e., CD-WMRM, DVD-WMRM). It is intended in this application that any reference to CD and/or DVD will include not only the formats noted above, but any other formats, currently known or yet to be developed, that are either compatible with the above formats, or are based on similar principles and criteria. Optical storage has the advantage of high capacity and durability, but is slower and more expensive than magnetic storage.

Various attempts have been made to combine multiple storage media into a single hybrid data storage device. For instance, several prior art devices combine a card with a linear magnetic strip and a similar linear optical strip running parallel to the magnetic strip. While devices to read magnetic strips are common, the same is not true for devices which read optical strips. Therefore, a special read/write device is required to work with the optical strip of these inventions.

Other prior art devices have disclosed materials with combined magnetic and optical properties, or disclosed separate magnetic and optical layers overlying the same surface area of a substrate. Such devices also require specialized read/write drive devices not readily available in the marketplace.

Even devices that comprise annular optical regions on rectangular cards require elaborate shuttle, rail, and turntable arrangements to insert the card into the read/write drive device, maneuver it into position, and rotate the card.

There has been no adequate response yet to the need for a convenient credit-card-like data storage device that takes advantage of the benefits of combined linear magnetic and annular optical data storage in a format that allows both storage media sections to be read by standard devices readily available in the marketplace.

SUMMARY OF THE INVENTION

What is proposed is a hybrid dual-media data storage device comprising a plastic or similar material card conforming in size and dimensions generally equivalent to a common credit card. One side of the card includes a magnetic strip, enabling the card to be used in standard magnetic card readers such as those found in automated teller machines ("ATMs"), credit card readers, security entry control devices, and the like. The opposite side of the card is configured with annular optical data tracks designed to be read by a CD or DVD drive. A central hole and rounded corners allow the card to be inserted into and used in a standard tray-loading CD or DVD drive.

Such a card has many uses which take advantage of the ease of use of the magnetic strip and the high capacity storage of the CD/DVD optical surface. Such a card could be used, for instance to store identification information on the magnetic strip, and large binary files on the CD/DVD surface. In this manner, entry to a computer center could be gained by swiping a properly-encoded card at an entry gate magnetic card reader, then the card user could run the software application stored on the CD/DVD surface on a computer within the computer center. A video store could provide a membership card through which membership identity and benefits can be accessed via the magnetic strip, and movie previews or excerpts could be stored on the CD/DVD surface.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan view of a storage device embodying the invention;

FIG. 2 is a bottom plan view of the storage device shown in FIG. 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring first to FIGURES 1 and 2, a data storage device comprises a card/body 10 having a top side 20, a hub/cutout 30, a magnetic strip 40, and surface design 50, where magnetic strip 40 is a linear magnetic data storage region, and bottom side 22 is an annular optical data storage region.

Card 10 is preferred to be a rectangle having rounded corners, measuring approximately 3-3/8" by 2-1/8", and having a cutout 30 having a diameter of approximately 9/16". It is contemplated that less preferred embodiments may be sized and dimensioned differently. Thus, various embodiments may be longer, shorter, wider, or narrower, and may even be circular, triangular, pentagonal, or some other shape. Similarly, the thickness of the card 10 may vary between embodiments and may not be uniform throughout the card for all embodiments, but in all cases must be of a thickness that will not interfere in the operation of standard magnetic card readers and CD/DVD drives contemplated for use with card 10. Typically card 10 will comprise at least three layers, linear data region 40, annular data region 22, and top side/substrate 20. Such layers may comprise any material so long as the linear and annular data regions allow data to be stored on them at least once, and to be retrieved at least once. It is contemplated that the bulk of card 10 will comprise a plastic.

Top side 20 is preferred to look substantially similar to the top/front surface of a typical credit card, possibly with embossed/raised and/or printed alphanumeric characters. In the preferred embodiment of FIGURE 1, magnetic strip/linear data region 40 is preferred to be part of or mounted on top of top side 20. In less preferred embodiments, linear data region 40 may be part of or located on bottom side 22, or may be sandwiched between top side 20 and bottom side 22. As used herein, a "linear data region" is a portion of the data storage device intended to be read by introducing relative linear motion between the storage device/card and a detection device. This is usually accomplished by sliding or "swiping" the card through a receiving slot in a stationary card reader device, though a moveable detector could be used that is then moved along the linear data region of a relatively stationary card.

Hub/cutout 30 is preferred to be sized and dimensioned to allow the data storage device 10 to be used in an industry standard reader and thus to be circular and to have diameter of approximately 9/16". Such industry standard readers include but are not limited to compact disc ("CD"), CD-ROM, CD-R, CD-RW, digital versatile disc ("DVD"), DVD-Audio, DVD-Video, DVD-ROM, DVD-RAM, DVD-R, and DVD-RW drives. Non-circular cutouts and/or cutouts having differing dimensions are also contemplated. The actual shape of the cutout may take any form so long as the card may be carried on the rotating spindle of, and can be read from and/or written to in, a CD/DVD-type drive designed to accept circular compact disc storage media. In certain storage data devices 10, additional chips may be mounted on the card itself for performing different functions. In those instances, the hub/cutout 30 may be positioned somewhat off centered to counterbalance the chip mounted on the card. As CD and DVD drives that read such discs, and drives capable of writing to such discs, are now quite common equipment on standard consumer personal computers, data from the card can be read and/or written by the typical personal computer owner without requiring the owner to purchase and/or install specialty hardware or software.

Bottom side/annular data region 22 is preferred to have the same properties as the data side of a typical CD/DVD-type disc and thus to have a plurality of optically readable annular tracks to be read through the use of a focused laser beam. In alternative embodiments, the annular data region may comprise some other arrangement of data tracks and may be magnetically readable or be readable by a method other than optically or magnetically so long as the data is annular. Examples of alternative contemplated storage methodologies include, but are not necessarily limited to, those various CD and DVD formats noted above. As used herein, an "annular data region" is a portion of the storage device intended to be read by introducing rotational motion of the storage device/card and a detection device about a common axis. Such annular data is usually read by rotating the card relative to a non-rotating detection device.

Linear data region 40 is preferred to be a magnetic strip approximately 5/8" wide and extending across the card. However, the linear data region 40 of alternative embodiments may have a non-linear shape or differing dimensions so long as the data stored

on it is stored linearly, i.e., requiring linear movement of the card or a pickup head to read the data. Similarly, the position of the linear data region may vary such that the strip may be located in any position on either side of or within the card body.

It is contemplated that the subject matter disclosed herein may have a number of uses including providing additional storage for security encryption on a card than can be provided by utilizing a single linear storage region. Such additional storage could be used to store software and/or biometrically-verifiable data such as, among other possibilities, voice signature identification data and representations of eye retina patterns.

In operation, the data storage card of this invention may be inserted into a standard magnetic card reader such as those found on ATMs (which often grasp the card and automatically pull it within the machine for reading) and credit card or point-of-sale machines (which either provide a longitudinal slot for "swiping" a card by a reader or which may provide a lateral slot which requires insertion of the card followed by quick removal to allow the card to be read) in order to read (and write to) the magnetic strip. The card can also be placed on the disc tray of a standard tray-loading CD or DVD drive such that the central hole of the data storage card is coaxial with the central hole of the disc tray, allowing the rotatable spindle to engage the card for rotation in the read/write process. Some CD/DVD drives combine the rotatable spindle in the disc tray (especially in such drives configured for laptop or portable computers and similar devices). In such cases, the card may be placed directly on the rotatable spindle. The CD/DVD drive is then operated in the conventional manner.

Thus, specific embodiments and applications of displays and methods for producing conservatively printed displays have been disclosed. It should be apparent, however, to those skilled in the art that many more modifications besides those already described are possible without departing from the inventive concepts herein. The inventive subject matter, therefore, is not to be restricted except in the spirit of the appended claims. Moreover, in interpreting both the specifications and the claims, all terms should be interpreted in the broadest possible manner consistent with the context. In particular, the terms "comprises" and "comprising" should be interpreted as referring to elements,

components, or steps in a non-exclusive manner, indicating that the referenced elements, components, or steps may be present, or utilized, or combined with other elements, components, or steps that are not expressly referenced.

WHAT IS CLAIMED IS:

1. A data storage device, comprising:

an elongated planar body having a first planar surface extending from end to end and a facially opposed second planar surface;

at least one non-visually readable data region disposed on said first planar surface; and

at least one non-visually readable linear data region disposed on one of said surfaces.

2. The data storage device of claim 1, wherein:

said planar body is an approximately rectangular wallet-size card.

3. The data storage device of claim 2 wherein:

said card further comprises a hub which defines a cutout portion of said card, and which is further sized and dimensioned to allow mounting and use in a compact disc or DVD drive device.

4. The data storage device of claim 3, wherein:

said cutout portion of said card has a circular shape having a diameter between 1/2" and 5/8".

5. The data storage device of claim 4, wherein:

said card comprises four corners and a center point equidistant from all four said corners; and

said cutout portion of said card is approximately centered on said center point of said card.

6. The data storage device of claim 5, wherein:

said annular data region comprises at least one optical track; and

said linear data region comprises at least one magnetic strip.

7. The data storage device of claim 6, further comprising:

a visually readable data region on one of said planar surfaces.

8. The data storage device of claim 7, wherein:

said at least one optical rack is accessible through said first planar surface; and

said visually readable data region has numerals and/or text printed and/or embossed on said second planar surface.

9. A data storage device, comprising:

an elongated planar body having a first surface planar extending from end to end and a facially opposed second planar surface;

an annular optical data storage region disposed on said first surface; and

a linear magnetic data storage region disposed on one of said surfaces.

10. The data storage device of claim 9, wherein:

said body defines a central hole, said central hole being configured with a diameter that allows the device to be received snugly on the rotatable spindle of a CD and/or DVD drive.

11. The data storage device of claim 9, wherein:

said body is configured to resemble a conventional credit card.

12. The data storage device of claim 11, wherein:

said body has lateral dimensions of approximately 3-3/8" x 2-1/8".

13. The data storage device of claim 9, wherein:

said linear magnetic data storage region is readable from one of said first and second surfaces; and

said annular optical data storage region is readable from another of said first and second surfaces.

14. The data storage device of claim 10, wherein:

said linear magnetic data storage region includes at least one linear data track to which information may be written at least once, and from which data may be read; and

said annular optical data storage region includes at least one annular data track to which information may be written at least once, and from which data may be read.

15. The data storage device of claim 14, wherein:

said at least one annular data track is configured concentrically around said central hole.

16. A data storage device, comprising:

an elongated planar body having a first surface planar extending from end to end and a facially opposed second planar surface;

an annular optical data storage region disposed on said first surface; and

a linear magnetic data storage region disposed on one of said surfaces.

17. The data storage device of claim 16, wherein:

said body defines a central hole, said central hole being configured with a diameter that allows the device to be received snugly on the rotatable spindle of a CD and/or DVD drive.

18. The data storage device of claim 16, wherein:

said body is configured to resemble a conventional credit card.

19. The data storage device of claim 18, wherein:

said body has lateral dimensions of approximately 3-3/8" x 2-1/8".

20. The data storage device of claim 16, wherein:

said linear magnetic data storage region is readable from one of said first and second surfaces; and

said annular optical data storage region is readable from another of said first and second surfaces.

21. The data storage device of claim 16, wherein:

said linear magnetic data storage region includes at least one linear data track to which information may be written at least once, and from which data may be read; and

said annular optical data storage region includes at least one annular data track to which information may be written at least once, and from which data may be read.

22. The data storage device of claim 21, wherein:

said at least one annular data track is configured concentrically around said central hole.

23. A hybrid magnetic-optical data storage card, comprising:

a first face which includes a magnetic data storage region;

a second face which includes an optical data storage region; and

means for utilizing said data storage card in conventional read/write drive devices.

24. The data storage card of claim 23, wherein:

said means for utilizing said data storage card in conventional read/write drive devices includes a central hole for receipt of a rotatable drive spindle.

25. The data storage card of claim 23, wherein:

said optical data storage region is compatible with conventional CD/DVD drives.

26. The data storage device of claim 4, wherein:

said card is symmetrical about a center point; and

said cutout portion of said card is positioned off center with respect to said center point.

27. The storage device of claim 4 that includes:

a chip mounted on said card.

28. A hybrid magnetic-optical storage device, comprising:

a rectangular card having a bottom planar surface extending from end to end and a facially opposed top planar surface;

a hub which defines a cutout portion positioned in the center of said card, said hub sized and dimensioned to operate on a rotatable spindle of a compact disc and/o a DVD drive device;

a linear magnetic strip disposed on said top planar surface;

an annular optical data storage region disposed on said bottom planar surface, said optical storage region having plurality of annular optical data tracks being positioned relative to one another in a continuous concentric pattern emanating radially outwardly from said hub;

a chip mounted on said card; and

a visually readable data region having numerals and/or text printed and/or embossed on said top surface.

29. A method of making a data storage card having both linear and annular data regions, including:

providing an elongated planar body having a first planar surface extending from end to end and a second planar surface;

providing at least one linear data storage region on said planar body; and

providing at least one annular data storage region on said planar body.

30. The method of claim 29 wherein:

said step of providing said linear data storage region includes positioning said region on one of said planar surfaces.

31. The method of claim 29 wherein:

said step of providing said annular data storage region includes positioning said storage region on said first planar surface.

32. The method of claim 29 wherein:

said planar body is an approximately rectangular wallet-size card having a hub which defines a cutout, said hub being sized and dimensioned to operate in a CD or DVD drive device.

33. The method of claim 29 wherein:

said linear data storage region is a linear magnetic strip; and

said annular data storage region is an annular optical storage region having at least one annular optical data track.

34. The method of claim 29 that includes:

providing a visually readable data region on said body.

35. The method of claim 34 wherein:

said step of providing a visually readable data region includes printing or embossing numerals and/or text on one of said planar surfaces.

36. A method of making a data storage card having both linear magnetic and annular optical data regions, including:

providing an elongated planar body having a first planar surface extending from end to end and a second planar surface, said body having a hub which defines a cutout sized and dimensioned to receive a rotatable spindle of a CD or DVD drive device;

selecting a linear magnetic data storage medium;

selecting an annular optical data storage medium;

positioning said magnetic data storage medium on said second planar surface to define a magnetic data storage region; and

positioning said annular data storage medium on said first planar surface to define an annular optical data storage region.

37. The method of claim 36, wherein:

said magnetic data storage region is a linear magnetic strip; and

said annular data storage region comprises at least one optical data track configured concentrically about said hub.

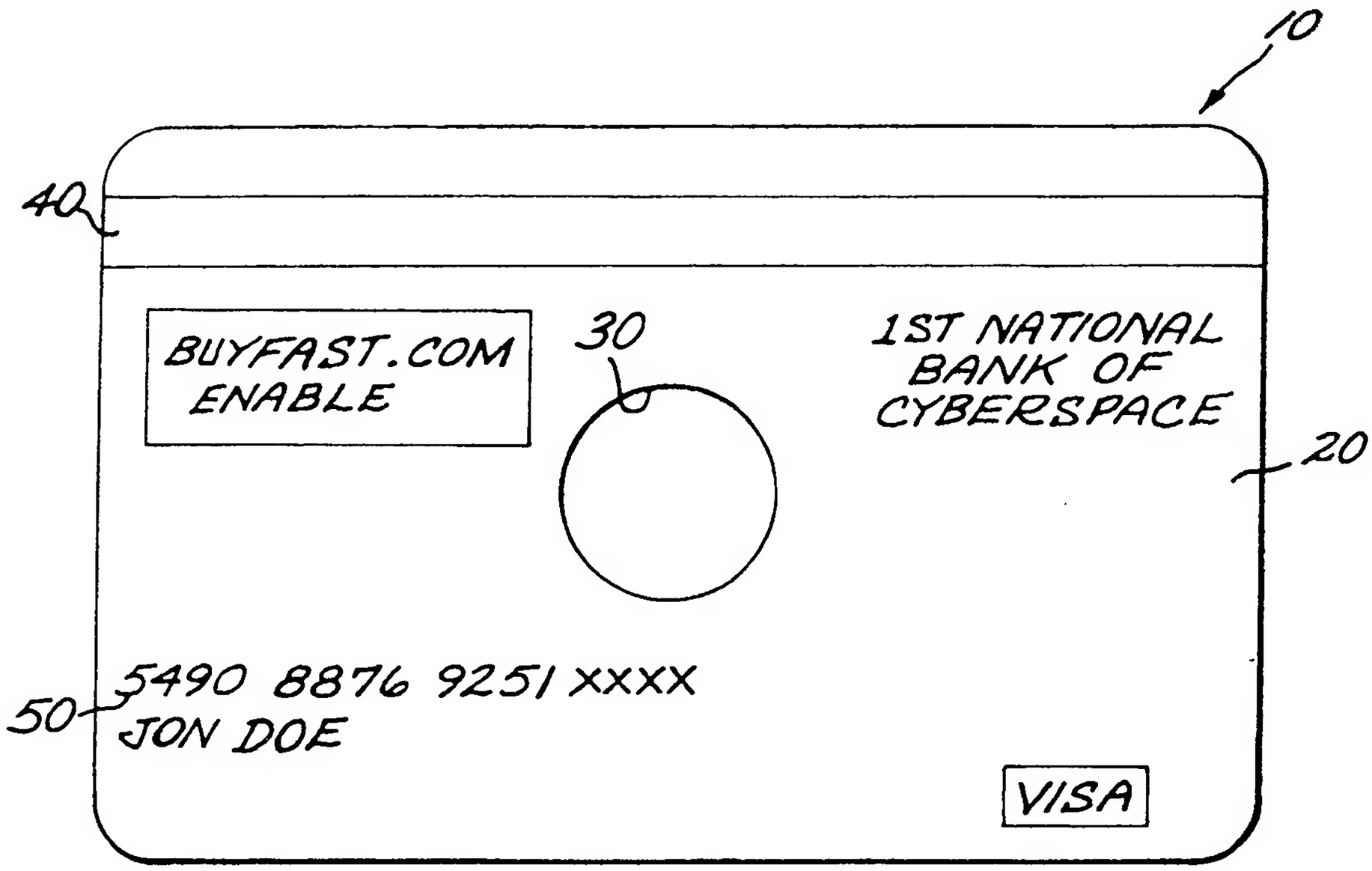

10
40
BUYFAST.COM
ENABLE
30
1ST NATIONAL
BANK OF
CYBERSPACE
20
5490 8876 9251 XXXX
50
JON DOE
VISA

FIG. 1

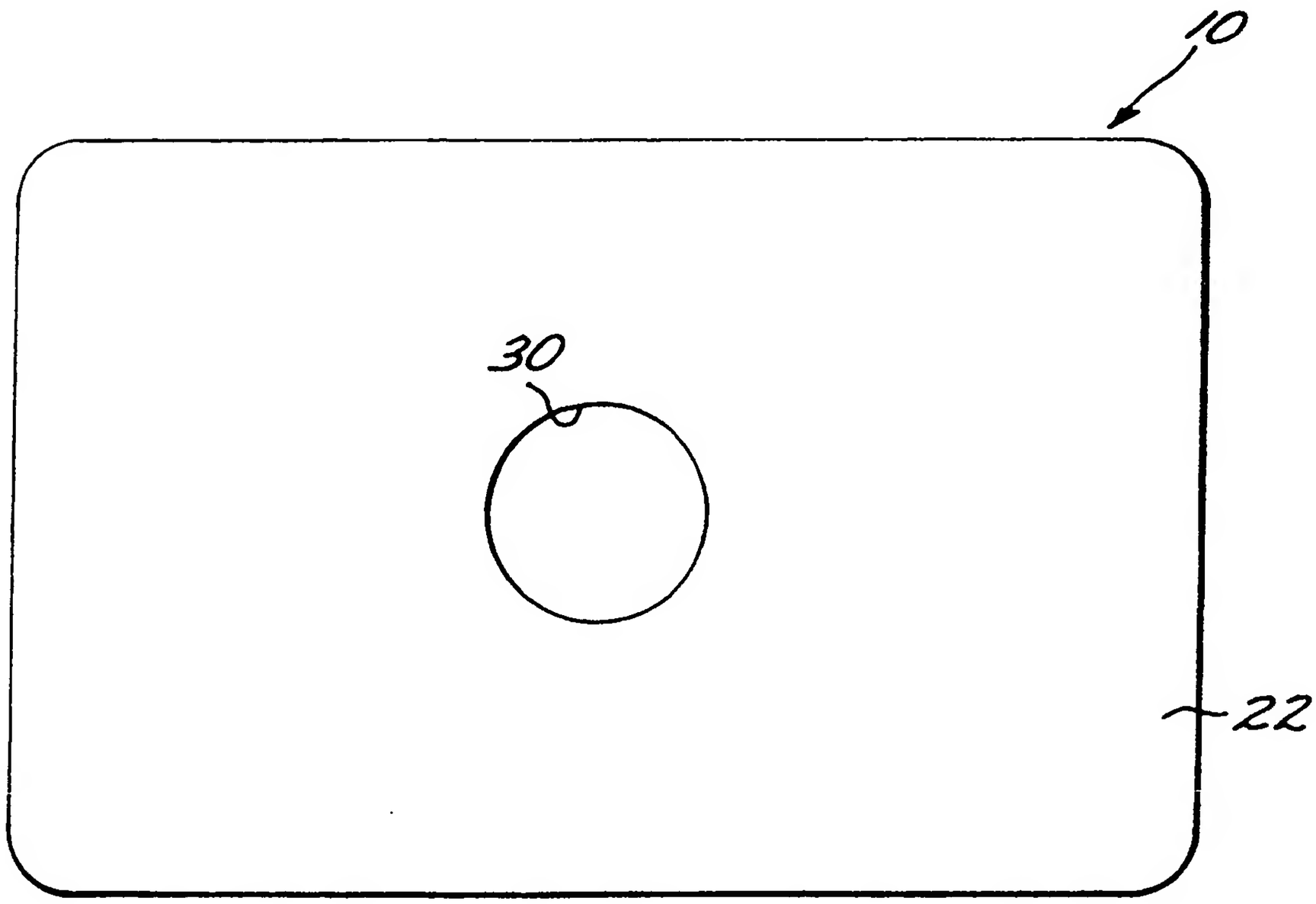

10
30
22

FIG. 2